



RA-15-059

10 CFR 50.73

July 6, 2015

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555 - 0001

Oyster Creek Nuclear Generating Station  
Renewed Facility Operating License No. DPR-16  
NRC Docket No. 50-219

Subject: Licensee Event Report (LER) 2015-002-00, Reactor SCRAM due Digital Protective Relay System Lockout

Enclosed is LER 2015-002-00, Reactor Scram due to the Digital Protective Relay System lockout trip which occurred on May 7, 2015. This event did not affect the health and safety of the public or plant personnel. This event did not result in a safety system functional failure. There are no regulatory commitments made in this LER submittal.

Should you have any questions concerning this letter, please contact Mike McKenna, Regulatory Assurance Manager, at (609) 971-4389.

Respectfully,

A handwritten signature in black ink, appearing to read "Jeffrey R. Dostal", written over a horizontal line.

Jeffrey R. Dostal  
Plant Manager  
Oyster Creek Nuclear Generating Station

Enclosure: NRC Form 366, LER 2015-001-00

cc: Administrator, NRC Region 1  
NRC Senior Resident Inspector - Oyster Creek Nuclear Generating Station  
NRC Project Manager - Oyster Creek Nuclear Generating Station

IE22  
NR2

**LICENSEE EVENT REPORT (LER)**(See Page 2 for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F59), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocoll@nrc.gov](mailto:infocoll@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NE03-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**1. FACILITY NAME**

Oyster Creek, Unit 1

**2. DOCKET NUMBER**

05000219

**3. PAGE**

1 OF 3

**4. TITLE**

Reactor SCRAM due to Digital Protective Relay System Lockout

| 5. EVENT DATE |     |      | 6. LER NUMBER |                   |         | 7. REPORT DATE |     |      | 8. OTHER FACILITIES INVOLVED |               |
|---------------|-----|------|---------------|-------------------|---------|----------------|-----|------|------------------------------|---------------|
| MONTH         | DAY | YEAR | YEAR          | SEQUENTIAL NUMBER | REV NO. | MONTH          | DAY | YEAR | FACILITY NAME                | DOCKET NUMBER |
| 05            | 07  | 2015 | 2015          | 002               | 00      | 07             | 06  | 2015 | N/A                          | N/A           |
|               |     |      |               |                   |         |                |     |      | FACILITY NAME                | DOCKET NUMBER |
|               |     |      |               |                   |         |                |     |      | N/A                          | N/A           |

  

| 9. OPERATING MODE | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 6: (Check all that apply) |   |  |   |
|-------------------|---|---|--|---|
| N                 | <input type="checkbox"/> 20.2201(b)   | <input type="checkbox"/> 20.2203(a)(3)(i)   | <input type="checkbox"/> 50.73(a)(2)(i)(C)             | <input type="checkbox"/> 50.73(a)(2)(vii)     |
|                   | <input type="checkbox"/> 20.2201(d)   | <input type="checkbox"/> 20.2203(a)(3)(ii)  | <input type="checkbox"/> 50.73(a)(2)(ii)(A)            | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
|                   | <input type="checkbox"/> 20.2203(a)(1)  | <input type="checkbox"/> 20.2203(a)(4)      | <input type="checkbox"/> 50.73(a)(2)(ii)(B)            | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |
|                   | <input type="checkbox"/> 20.2203(a)(2)(i)   | <input type="checkbox"/> 50.36(c)(1)(i)(A)  | <input type="checkbox"/> 50.73(a)(2)(iii)              | <input type="checkbox"/> 50.73(a)(2)(ix)(A)   |
| 10. POWER LEVEL   | <input type="checkbox"/> 20.2203(a)(2)(ii)  | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x)       |
|                   | <input type="checkbox"/> 20.2203(a)(2)(iii)   | <input type="checkbox"/> 50.36(c)(2)        | <input type="checkbox"/> 50.73(a)(2)(v)(A)             | <input type="checkbox"/> 73.71(a)(4)          |
|                   | <input type="checkbox"/> 20.2203(a)(2)(iv)  | <input type="checkbox"/> 50.46(a)(3)(ii)    | <input type="checkbox"/> 50.73(a)(2)(v)(B)             | <input type="checkbox"/> 73.71(a)(5)          |
|                   | <input type="checkbox"/> 20.2203(a)(2)(v)   | <input type="checkbox"/> 50.73(a)(2)(i)(A)  | <input type="checkbox"/> 50.73(a)(2)(v)(C)             | <input type="checkbox"/> OTHER                |
|                   | <input type="checkbox"/> 20.2203(a)(2)(vi)  | <input type="checkbox"/> 50.73(a)(2)(i)(B)  | <input type="checkbox"/> 50.73(a)(2)(v)(D)             | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME

Michael McKenna, Regulatory Assurance Manager

TELEPHONE NUMBER (Include Area Code)

(609) 971-4389

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
| A     | N/A    | N/A       | N/A           | N                  | N/A   | N/A    | N/A       | N/A           | N/A                |

**14. SUPPLEMENTAL REPORT EXPECTED**☒ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☐ NO**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|-------|-----|------|
| 07    | 06  | 15   |

ABSTRACT (Limit to 1400 spaces, i.e., approximately 16 single-spaced typewritten lines)

On May 7, 2015 at 1727 hours, a Main Turbine Trip and subsequent Reactor Scram occurred from a trip of the Main Transformer Differential Lockout Relay, 86T. The Main Transformer Differential Lockout Relay, 86T is a protection function provided by Digital Protection Relay System "B" (DPRS B). The 86T trip signal was sensed and cleared, without operator action, in 17 milliseconds (ms) or 1 cycle prior to the 230KV output breakers opening. The results of extensive troubleshooting ruled out an actual fault in the Main Transformers or Iso-phase Bus, and determined that the Main Transformer Differential Relay actuation was a spurious trip, and not due to an actual degraded equipment condition.

ENS 51055 was submitted on May 7, 2015 as required by 10 CFR 50.72 (b)(2)(iv)(B). This issue is reportable under 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B).

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOS-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

| 1. FACILITY NAME     | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |
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|                      |           | YEAR          | SEQUENTIAL NUMBER | REV NO. |         |
| Oyster Creek, Unit 1 | 05000219  | 2015          | - 002             | - 00    | 2 OF 3  |

**NARRATIVE****Description of Event**

On May 7, 2015 at 1727, a turbine trip and subsequent reactor scram occurred from a trip of the Main Transformer Differential Lockout Relay, 86T. The Main Transformer Differential Lockout Relay, 86T is a protection function provided by Digital Protection Relay System "B" (DPRS B). The results of extensive troubleshooting ruled out an actual fault in the Main Transformers or Iso-phase Bus; therefore, the Main Transformer Differential Relay actuation was a false trip. The intermittent condition was sensed and cleared on its own in 17 milliseconds (ms) or 1 cycle prior to the 230 KV output breakers opening.

The results of the troubleshooting did not determine a definitive cause. The results of the troubleshooting ruled out an actual fault in the Main Transformers or Iso-phase Bus; therefore, the Main Transformer Differential Relay actuation was a false trip. The differential current on the 'A' Phase sensed by the Digital Protection Relay System B (DPRS B) was intermittent and of short duration. The 42% imbalance exceeded the set point of 30% on the A phase and triggered a A phase differential current fault resulting in 87T trip signal. The trip signal cleared automatically after 17 milliseconds. The possible causes are an intermittent signal in the Current Transformers (CTs) such as a short in the CTs' secondary wiring or an intermittent signal in the DPRS hardware such as a short in a circuit card component.

**Analysis of the Event**

Following the actuation, all systems responded as expected; therefore, this event is of low safety significance.

**Cause of Event**

A complex troubleshooting plan was developed and implemented during the shutdown. As a result of the troubleshooting, no definitive cause of the trip could be ascertained. The root cause team reviewed the troubleshooting plan along with all the data obtained during the troubleshooting and could not positively identify the cause of the trip. Based on the information available and Operating Experience (OPEX) information reviewed, the team determined that the most probable cause was an intermittent short in the CT wiring associated with this trip circuit caused by aging cables adversely impacted by their environment. This circuit has been continuously monitored since the SCRAM. Since installation, the monitoring equipment identified only a single indication of a voltage differential however that indication, which occurred on June 29, 2015, was caused by a grid disturbance and would not have processed a trip.

All applicable wiring was tested for insulation resistance and continuity. All test results were satisfactory. Age related cable and terminal block degradation (cracked insulation, exposed copper conductors, and corrosion on terminal blocks) was found on the Auxiliary Transformer CT wiring. Megger testing to ground of this wiring and the other CT wiring for the Main Transformers and Main Generator were acceptable. Additionally, since the DPRS data indicated that the condition cleared in 17 milliseconds, it would be unlikely to find a hard ground during the testing. While there is no conclusive evidence as to the, cause of failure it is considered to be the most likely cause.

A risk assessment was required per Procedure PI-AA-125-1001 since the primary or root cause was determined to be indeterminate. The evaluation determined that actions completed as a result of this event investigation were adequate to prevent recurrence and no further actions were required. Since all of the major equipment tested satisfactory and has subsequently been placed back in service after the event, the team concluded that the trip was caused by a spurious trip of the protection circuit. A modification has been installed that replaced the entire circuit

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**NARRATIVE**

with a Sudden Pressure Relay trip circuit. Therefore, since all DPRS "B" trip functions including the Main Transformer Differential Relay, 87T, trip are disabled, a similar false trip from DPRS "B" would likely be prevented in the future.

**Corrective Actions**

To address the most probable cause of CT wiring or termination experiencing an intermittent short, open (momentary high resistance), or induced transient due to aging, the following actions were taken:

- A modification was installed replacing the Main Transformer differential trip with a two-out-of-three logic sudden pressure sensing and trip circuit system under Engineering Change Request (ECR) 15-00197.
- All DPRS "B" trip functions including the Main Transformer Differential Lockout Relay, 87T, trip were disabled. The modification effectively eliminated the potential for a spurious trip from any equipment associated with the DPRS "B" trip functions including the Main Transformer differential trip scheme.
- Oyster Creek has established a project to define the critical cables that traverse these areas and to take actions to mitigate the risk of future events for other systems.

**Previous Occurrences**

There were no previous occurrences of a spurious DPRS trip at Oyster Creek although several similar issues have been identified throughout the industry.